

# *Analysis of the Innovation Benefits of Different Open Level Innovation Models*

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**Abstract:** The main source of closed innovation income is the special-purpose system; the main source of cooperative innovation income is the special-purpose system and complementary assets; the main source of open-type innovation income is complementary assets and dominant design; the main source of network innovation income leads design and complementarity assets. The key to future world competition is the competition of science and technology. The essence of competition in science and technology is innovation competition. Innovation has become a key factor in economic and social development.

## **1. Introduction**

Closed innovation is completely closed, with clear and clear boundaries (generally enterprise boundaries). It is based on the internal innovation and R&D of the enterprise and is expressed as a complete monopoly or monopoly on the innovation results of enterprises (a certain period of time). Since the beginning of the 20th century, more and more enterprises (especially manufacturing industries) have realized that competition among enterprises is the competition of technology. In order to obtain and maintain the dominant position in the industry, enterprises often recruit the best industry talents and purchase advanced equipment to establish R&D. The platform strives to achieve breakthroughs in innovation through the company's own R&D investment, develop new products or services, and quickly bring new products or services to the market to earn lucrative market profits. At the same time, the company's new products and technologies acquired through its own research and development breakthroughs are controlled in the form of intellectual property rights (such as patent rights), using the monopoly of intellectual property rights to obtain market monopoly status, and to form technical barriers. In the closed innovation model, the innovation revenue comes from the exclusiveness of innovation results. Qualcomm is a typical closed innovation case with patents as the innovative knowledge income model. At present, Qualcomm has completely faded out of the manufacturing and sales links. It is enough to rely on patent grants to ensure that Qualcomm can focus on technology research and development, and increase the number of patents in a virtuous cycle. Qualcomm charges patent license fees (fixed fees) and royalties (royalty based on mobile phone sales) for manufacturers using its mobile phone chips. At the same time, due to its unique technical advantages, Qualcomm has adopted "buy necessary patents to package non-essential patents", "The sales strategy of purchasing valid patent packaged expired

patents” and “reverse patent authorization and collecting protection fees” further strengthened the benefits of closed innovation knowledge <sup>[1]</sup>.

## **2. Cooperative Innovation: Connotation and Income**

### **2.1. Connotation and Characteristics**

Cooperative innovation is an innovative activity carried out by two or more entities on the basis of division of labor and cooperation. Since R&D is the main link of innovation, cooperative innovation is mainly concentrated in R&D cooperation. Since the 1980s, with the increasing competition, single companies have been unable to meet the market demand for innovation by relying on their own R&D investment, especially those industries that require high-tech industries and require multidisciplinary cooperation, such as information technology and artificial intelligence. And other fields. At the same time, some universities and research institutions have the problem of overcapacity and the inability of industrialization to achieve industrialization. Based on the principle of complementary advantages, the company establishes a synergistic and innovative cooperation model (mainly R&D cooperation) with other enterprises, universities and research institutions. The typical characteristics of the cooperative innovation model are: "cooperate in competition and compete in cooperation." Cooperative innovation is an open innovation under a large closed system. Cooperative innovation has a certain degree of openness, but there is still a clear boundary. Under the cooperative innovation model, the boundaries between partners can penetrate each other and share resources within a certain scope, but the partners form a large and clear boundary, which is still closed to the outside world outside the system <sup>[2]</sup>.

### **2.2. Innovation Income**

Cooperative innovation mainly applies to the external technology environment with rich knowledge. The main sources of innovation income are the specialized system and the complementary assets. For example, Apple adopts a cooperative innovation model, and the various products that Apple sells are based on the synergy with many supply companies. Apple did not fully adopt the development model of open source code and open hardware interface, but chose the open innovation model under the closed system. The "closed system" in the open innovation model under this closed system refers to a large cooperative innovation system jointly established by many small and medium-sized enterprises in the world that Apple gathers on the "Apple Store" platform, which is closed outside the system. The "closed system" is different from the completely open innovation model, which is embodied in the exclusive scope of intellectual property rights. At the same time, the "open innovation" in the open innovation model under this closed system refers to the apple and the gathering in "Apple." Many small and medium-sized enterprises in the world of shops are open and infiltrated with each other. Apple makes full use of the innovation vitality of small and medium-sized software companies to make up for the lack of innovation and innovation of its own large enterprises. It is in the form of software outsourcing and crowdsourcing with many small and medium-sized software companies. The “Apple Store” platform forms the most extensive innovation cooperation, and Apple and SMEs are divided into 3/7 ratios. The fact that Apple ranked first in the Fortune Global 500 in 2018 demonstrates the effectiveness of Apple's innovative model.

### 3. Open Innovation

#### 3.1. Connotation and Characteristics

The open innovation model refers to enterprises in the process of technological innovation, while using internal and external complementary innovation resources to achieve innovation, the internalization of the internal technology of the enterprise can be carried out internally, or through external channels, with multiple partners. A new type of innovation model for multi-angle dynamic cooperation. In the open innovation model, companies realize that they can't find all the smart people to work for themselves, realize that they can't create the most innovative ideas in the industry and commercialize innovative ideas, and realize that building a good one. The business model makes full use of resources to create greater benefits than the possession of resources. Open innovation will share part of external R&D through internal R&D, improve its own intellectual property system by purchasing other people's intellectual property rights, and use these innovative intellectual property rights for product development and production, and also benefit others by using their own intellectual property rights<sup>[3]</sup>.

#### 3.2. Innovation Income

Open innovation is mainly applicable to a knowledge-rich external technology environment. The benefits are reflected in the following two aspects: First, internal R&D costs are reduced, especially R&D time costs are greatly reduced. Second, innovative intellectual property rights are used for industrialization. External (traditional income), intellectual income (non-traditional income) can also be obtained through external commercialization of intellectual property (capitalization of intellectual property rights, commercialization of intellectual property rights, standardization of intellectual property rights), that is, open innovation income is mainly derived from Complementary assets and dominant design. For example, the successful operation of LILLY's Open Drug Discovery (OIDD) community is an open innovation paradigm. In order to make better use of external talent, Lilly has invested in a wholly-owned subsidiary, InnoCentive. InnoCentive brings together a wide range of pharmaceutical companies, research institutions and academics from more than 170 countries around the world. These innovative professionals can find their own professional and interesting research topics at InnoCentive, and have the opportunity to participate and even host the completion. Those world-class research and development projects are recognized by the public and realize their own value. Most importantly, the OIDD community is not only targeting drug development, but also looking for long-term goals such as potential partners. Through the OIDD program "Glass Spreading Network", Eli Lilly has extensive contacts with academic organizations and other parties inside and outside the industry, combining internal research resources with external research institutions, and establishing close relationships with these external research institutions through joint R&D and R&D. Outsourcing, companies also reduce risks and costs. And along with the in-depth development of the project on the platform, Eli Lilly can also find and test the potential of the partners, turning the knowledge into revenue for the company's human resources or through licensing agreements or comprehensive acquisitions. For another example, Midea Group has created an open innovation platform – the US-based platform. The platform will open up the high-quality resources of the Midea Group, top research institutions, incubators and other high-quality resources to the users on the platform. Midea Group collects user needs online, publishes the demand on the platform, extensively collects innovative solutions, and conducts the winning bidding scheme. Under the offline transaction, Midea Group shares the results of collaborative research with platform users. Through the US-created platform, Midea Group has introduced external competition to stimulate the innovation vitality of all employees, reduce innovation risks,

enhance the success rate of innovation, and successfully transform from simple technology improvement to innovation, from independent research and development to internal and external research and development. Change 4. Conclusion

In general, as an open ecosystem, the innovation cluster will change its entropy value in the process of energy exchange with the external environment, resulting in unbalanced cluster development and random fluctuations. According to the degree of fluctuations, companies in the innovation cluster will take appropriate actions and will have a positive impact on the development of innovation clusters. This paper puts forward the following suggestions for the development of innovative clusters on the self-organized evolution path and development characteristics of innovation clusters:

First of all, an open environment is a precondition for the evolution of the innovation cluster system, and the system is optimized and upgraded by continuously absorbing negative entropy flow. The inflow of negative entropy flow can be promoted in the following ways: Increase cooperation within the cluster, improve the innovation capability of the cluster, and actively introduce advanced technologies to promote the inflow of technology flows;

Secondly, relevant government departments adjust their functions and positioning, give full play to their guiding role, actively formulate policies to promote the development of innovation clusters, and ensure fair competition in the entire market; support the optimization cooperation between universities and related institutions and innovative cluster enterprises, and always adhere to innovative enterprises the core position.

#### 4. Conclusions

In general, as an open ecosystem, the innovation cluster will change its entropy value in the process of energy exchange with the external environment, resulting in unbalanced cluster development and random fluctuations. The relevant government departments adjust their functions and positioning, give full play to their guiding role, actively formulate policies to promote the development of innovation clusters, and ensure fair competition in the entire market; support the optimization cooperation between universities and related institutions and innovative cluster enterprises, and always adhere to innovative enterprises.

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